

BELLCOMM, INC.

SUBJECT: S-IB Quarterly Review
Case 330

DATE: June 16, 1967

FROM: A. T. Ackerman

ABSTRACT

The S-IB Quarterly Review of June 7, 1967, covered the following points:

The electrical inspection of S-IB-4 uncovered defects that were the result of wear and tear. Action is being taken which will improve these conditions.

Engine contamination was observed on engines of S-IB-11. Procedures are being incorporated to inspect for contamination, clean and rebuild engines showing signs of contamination.

TLM equipment of S-IB-4 was inspected and out of 100,000 solder joints, 380 were found cracked. Repairs are presently being made and new fabrication and inspection techniques are being developed.

The various detail considerations of storing the S-IB stages were discussed.

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(Bellcomm, Inc.) 3 p

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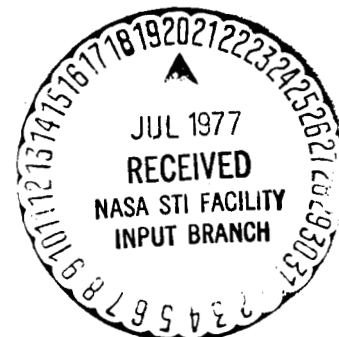
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MEMORANDUM FOR FILE

NASA Offices and Research Centers
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The S-IB Quarterly Review was held at the Michoud Assembly Facility on June 7, 1967.

Electrical Inspection of S-IB-4 at KSC

The electrical inspection uncovered 178 conditions where defects were found. One hundred two of these conditions were within present specification. Tightening of the specifications is intended to improve the wiring. The rest of the conditions were due to wear and tear and age.

Fiberglas tape is being used to cover worn electrical lines. It was pointed out to Chrysler that they review the Lockheed Georgia film report on the fire hazards of using Fiberglas insulated wiring.

Engine Contamination

Swab check of the LOX turbopump bearing seal cavity of the H-1 engines of vehicle S-IB-11 indicated the presence of moisture. Upon disassembly of the engine, white powder was found in the seal cavity area. This white powder was analyzed to be aluminum corrosion products. Stages S-IB-4 through -12 have been checked and only on -11 has moisture been found in the seal cavity. It is postulated that the white powder was the result of galvanic action between the two types of aluminum alloys (AS 356 and AS 1050) and a brass shim, in the presence of the moisture found in the cavity. The moisture was the residual of the leak test fluid (Leak-Tek).

One possible way moisture can get into the LOX turbopump bearing cavity seal area is through the LOX drain line when the stage is rotated. The engine LOX drain lines of S-IB-4 through S-IB-12 were checked for moisture. Traces of leak test fluid were found on S-IB-7, -8, -10, -11 and -12.

Engines with moisture in the LOX cavity seal will be sent back to be torn down, inspected, cleaned and rebuilt.

Plastic bags that were used as covers over the drain lines are being replaced with plastic plugs. The plastic bags are considered inadequate and a possible cause for moisture getting into the drain line.

Cracked Solder Joint

The TLM equipment of S-IB-4 was inspected and out of 100,000 solder joints, 380 cracked solder joints were found. It was determined that the cracks were the result of thermal over-stressing, coupled with repeated usage. The two main areas of cracks were in the printed circuit board connectors and the transistors/circuit-board joints. Repairs are presently being made to all cracked solder connectors and new fabrication and inspection techniques are being developed.

Stage Storage

The major storage considerations of the S-IB stage are: removal of critical components, environmental control, cycling of components, inspection periods, rotation of stage, storage of removables, refurbishment and incorporation of modifications.

The storage environmental control will consist of an active dry air purge to be maintained in the instrument compartment, propellant tanks and tail section.

Cyclic operation tends to improve performance and operational life of mechanical components.


A. T. Ackerman

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